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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/488,973	01/20/2000	Chris Parfeniuk	H057-002	5174

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EXAMINER

COLEMAN, WILLIAM D

ART UNIT PAPER NUMBER

2823

DATE MAILED: 10/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/488,973

Applicant(s)

PARFENIUK ET AL.

Examiner

W. David Coleman

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) ____ is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) ____ is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 11-16 and 19-37 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 10-16 and 19-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin, et al., "Grain Morphology, Texture, and Microhardness Gradients in Aluminum Diffusion-Bonded To Aluminum Oxide", Acta Materialia, Elsevier, vol. 1, no. 2, pp 501-515, January 15, 1999.

4. Lind discloses a semiconductor method as claimed. See pages 501-515 and particularly figure 9(b) of page 508 which discloses the grain size in microns.

5. Pertaining to claim 10, Lin discloses a method of bonding a physical vapor deposition target material to a backing plate material, comprising:

joining the target material and backing plate material in physical contact with one another, the backing plate and target material both predominately comprising aluminum; and thermally treating the joined target and backing plate materials to simultaneously diffusion bond

Art Unit: 2823

the target material to the backing plate material and develop grains in the target material, the diffusion bonding comprising solid state diffusion between the backing plate and target materials, a predominate portion of the developed grains having a maximum dimension of less than 100 microns.

6. Pertaining to claim 11, Lin discloses the method of claim 10 wherein all of the developed grains have the maximum dimension of the less than 100 microns.

7. Pertaining to claim 12, Lin discloses the method of claim 10 wherein the maximum dimension of the predominate portion of the developed grains is less than or equal to about 50 microns.

8. Pertaining to claim 13, Lin discloses the method of claim 12 wherein all of the developed grains have the maximum dimension of the less than or equal to about 50 microns.

9. Pertaining to claim 14, Lin discloses the method of claim 10 wherein the maximum dimension of the predominate portion of the developed grains is from about 30 microns to less than 100 microns.

10. Pertaining to claim 15, Lin discloses the method of claim 14 wherein all of the developed grains have the maximum dimension of from about 30 microns to less than 100 microns.

11. Pertaining to claim 16, Lin discloses the method of claim 10 wherein the backing plate material comprises a same predominate component as the target material.

12. Pertaining to claim 19, Lin discloses the method of claim 10 wherein the grain development comprises re-crystallization of grains within the target material.

13. Pertaining to claim 20, Lin discloses the method of claim 10 wherein the grain development comprises growth of grains within the target material.

Art Unit: 2823

Pertaining to claim 21, Lin discloses the method of claim 10 further comprising, before the joining, work-hardening the target material.

14. Pertaining to claim 22, Lin discloses the method of claim 10 further comprising, before the joining, work-hardening the target material by compressing the target material from an initial thickness to a final thickness, the final thickness being less than or equal to about 40% of the initial thickness.

15. Pertaining to claim 23, Lin discloses the method of claim 10 further comprising, before the joining, work-hardening the target material by compressing the target material from an initial thickness to a final thickness, the final thickness being from about 40% to about 2% of the initial thickness.

16. Pertaining to claim 24, Lin discloses the method of claim 10 further comprising, before the joining, work-hardening the target material, and wherein the grain development comprises re-crystallization of grains from the work-hardened material.

17. Pertaining to claim 25, Lin discloses the method of claim 10 further comprising, before the joining, work-hardening the target material, and wherein the grain development comprises: Re-crystallization of grains from the work-hardened material; and growth of the re-crystallized grains.

18. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Art Unit: 2823

19. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

20. Claims 26-37 rejected under 35 U.S.C. 102(e) as being anticipated by Bardus et al., U.S. Patent 6,183,686 B1.

Bardus discloses a semiconductor process as claimed. See FIGS. 1-10, where Bardus teaches Applicants claimed invention.

21. Pertaining to claim 26, Bardus discloses a method of forming a physical vapor deposition target bonded to a backing plate, comprising:

joining a physical vapor deposition target material and backing plate material in physical contact with one another, the physical vapor deposition target and backing plate materials both comprising aluminum; and

thermally treating the joined physical vapor deposition target and backing plate materials under an atmosphere which is inert relative to reaction with the physical vapor deposition target and backing plate materials, the thermally treating simultaneously diffusion bonding the physical vapor deposition target material to the backing plate material and developing grains in the physical vapor deposition target material, the diffusion bonding comprising solid state diffusion between the backing plate material and the physical vapor deposition target material to adhere the physical vapor deposition target material to the backing

Art Unit: 2823

plate material with a bond strength of at least about 6000 pounds/inch² (column 2, line 56), and a predominate portion of the grains developed in the target material being less than 100 microns in maximum dimension after the thermally treating of the target and backing plate materials.

22. Please note that Bardus discloses aluminum particles having a dimensional range of 1 micron to 50 microns. It is well known that aluminum is a metal and that all metals have some type of crystal structure. Since the particle size is as small as 1 micron, the grain size at most can be no large than the particle size and therefore meets Applicants claimed invention.

23. Pertaining to claim 27, Bardus discloses the method of claim 26 wherein the backing plate material and physical vapor deposition target material bath predominately comprise aluminum.

24. Pertaining to claim 28, Bardus discloses the method of claim 26 wherein the grain development comprises re-crystallization of grains within the physical vapor deposition target material.

25. Pertaining to claim 29, Bardus discloses the method of claim 26 wherein the thermally treating comprises maintaining the joined physical vapor deposition target material and backing plate material at a temperature of from about 280°C to about 400° for a time of from about 20 minutes to about 60 minutes (see Skibo et al., U.S. Patent 5,167,920 which is incorporated by reference) and pressing the joined physical vapor deposition target and backing plate materials to a pressure of at least 12,500 pounds/in² during at least part of the time that the temperature is maintained.

Art Unit: 2823

26. Pertaining to claim 30, Bardus discloses the method of claim 29 further comprising cooling the joined physical vapor deposition target and backing plate materials with a liquid after the temperature treatment.

27. Pertaining to claim 31, Bardus discloses the method of claim 29 further comprising cooling the joined physical vapor deposition target and backing plate materials with a gas after the temperature treatment.

28. Pertaining to claim 32, Bardus discloses the method of claim 26 wherein the grain development comprises growth of grains within the physical vapor deposition target material.

29. Pertaining to claim 33, Bardus discloses the method of claim 26 further comprising, before the joining, work-hardening the physical vapor deposition target material.

30. Pertaining to claim 34, Bardus discloses the method of claim 26 further comprising, before the joining, work-hardening the physical vapor deposition target material by compressing the physical vapor deposition target material from an initial thickness to a final thickness, the final thickness being less than or equal to about 4.0% of the initial thickness.

31. Pertaining to claim 35, Bardus discloses the method of claim 26 further comprising, before the joining, work-hardening the physical vapor deposition target material by compressing the physical vapor deposition target material from an initial thickness to a final thickness, the final thickness being from about 40% to about 2% of the initial thickness.

32. Pertaining to claim 36 Bardus discloses the method of claim 26 further comprising, before the joining, work-hardening the physical vapor deposition target material, and wherein the grain development comprises re-crystallization of grains from the work-hardened material.

Art Unit: 2823

33. Pertaining to claim 37, Bardus discloses the method of claim 26 further comprising, before the joining, work-hardening the physical vapor deposition target material, and wherein the grain development comprises:

re-crystallization of grains from the work-hardened material; and growth of the re-crystallized grains.

Claim Rejections - 35 USC § 103

34. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

35. Claims 22, 23, 29 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bardus et al., U.S. Patent 6,183,686 B1.

36. Pertaining to claims 22, 23, 29 and 35, given the teaching of the references, it would have been obvious to determine the optimum thickness, temperature as well as condition of delivery of the layers involved. See *In re Aller, Lacey and Hall* (10 USPQ 233-237) "It is not inventive to discover optimum or workable ranges by routine experimentation. Note that the specification contains no disclosure of either the critical nature of the claimed ranges or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 f.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Art Unit: 2823

Any differences in the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)

Appellants have the burden of explaining the data in any declaration they proffer as evidence of non-obviousness. *Ex parte Ishizaka*, 24 USPQ2d 1621, 1624 (Bd. Pat. App. & Inter. 1992).

An Affidavit or declaration under 37 CFR 1.132 must compare the claimed subject matter with the closest prior art to be effective to rebut a prima facie case of obviousness. *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979).

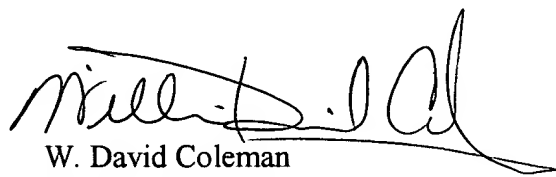
Conclusion

37. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 703-305-0004.

The examiner can normally be reached on 9:00 AM-5:00 PM.

38. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

39. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.


W. David Coleman
Primary Examiner
Art Unit 2823

WDC